

7.1 Day 2 Notes

Key

Objective: graphing transformations of exponential growth & decay functions

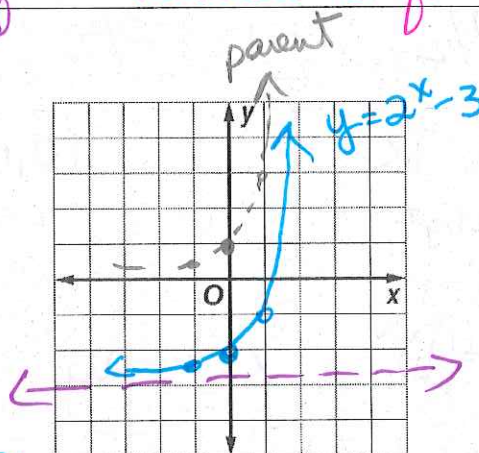
Transformations: $f(x) = ab^{x-h} + k$

Annotations:
 - horizontal shift (pointing to h)
 - vertical shift (pointing to k)
 - vertical stretch (pointing to a)

1. $y = 2^x - 3$ ← 3 Down
 $y = 2^x$

x	y
-1	1/2
0	1
1	2

x	y-3
-1	-2 1/2
0	-2
1	-1



Domain: \mathbb{R}

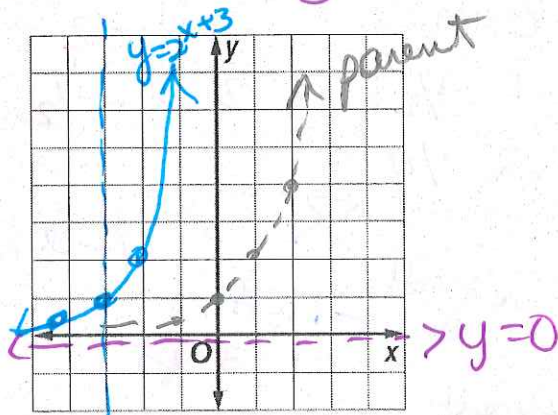
Range: $(-3, \infty)$

Asymptote: $y = -3$

2. $y = 2^{x+3}$ ← 3 Left
 $y = 2^x$

x	y
-1	1/2
0	1
1	2

x-3	y
-4	1/2
-3	1
-2	2



Domain: \mathbb{R}

Range: $(0, \infty)$

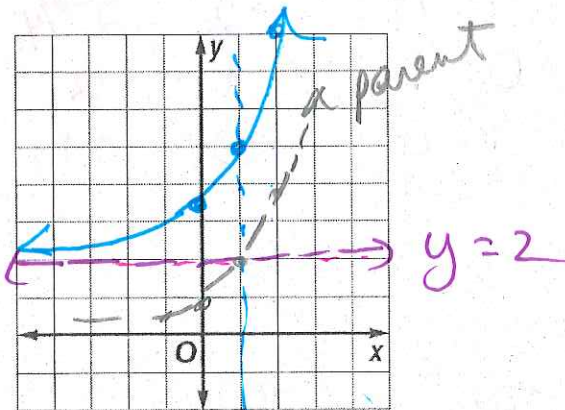
Asymptote: $y = 0$

vertical stretch by 3
 ← 1 right
 - 2 up
 parent

3. $y = 3(2)^{x-1} + 2$

x	y
-1	1/2
0	1
1	2

x+1	3y+2
0	3 1/2
1	5
2	8



Domain:

\mathbb{R}

Range:

$(2, \infty)$

Asymptote:

$y = 2$

vert. stretch by 3

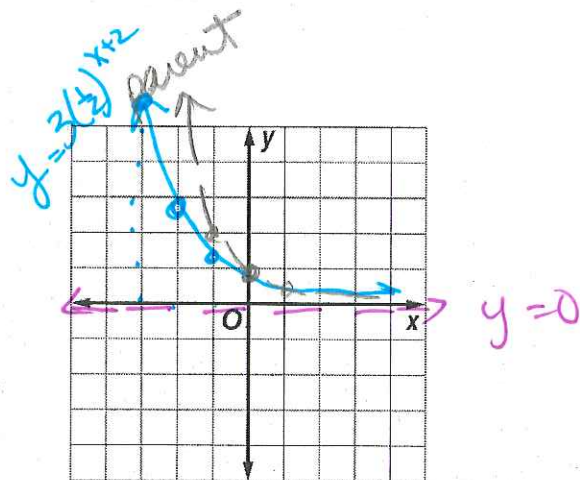
-2 Left

4. $y = 3 \left(\frac{1}{2}\right)^{x+2}$

parent $y = \left(\frac{1}{2}\right)^x$

x	y
-1	2
0	1
1	1/2

x-2	3y
-3	6
-2	3
-1	3/2



Domain: \mathbb{R}

Range: $(0, \infty)$

Asymptote: $y = 0$

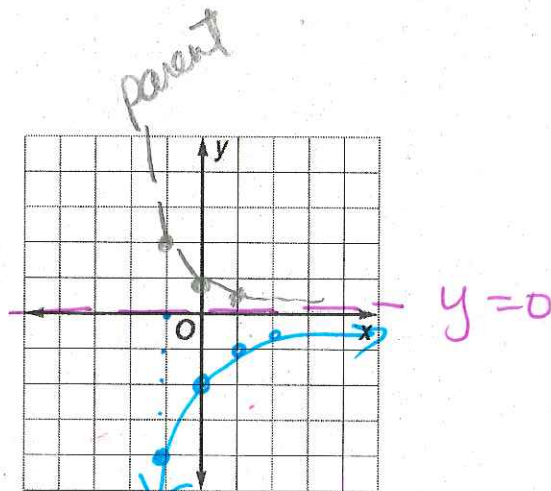
vert. stretch by 2
vert. refl.

5. $y = -2 \left(\frac{1}{2}\right)^x$

parent $y = \left(\frac{1}{2}\right)^x$

x	y
-1	2
0	1
1	1/2

x	-2y
-1	-4
0	-2
1	-1
2	-1/2



Domain: \mathbb{R}

Range: $(-\infty, 0)$

Asymptote: $y = 0$

vert. refl.

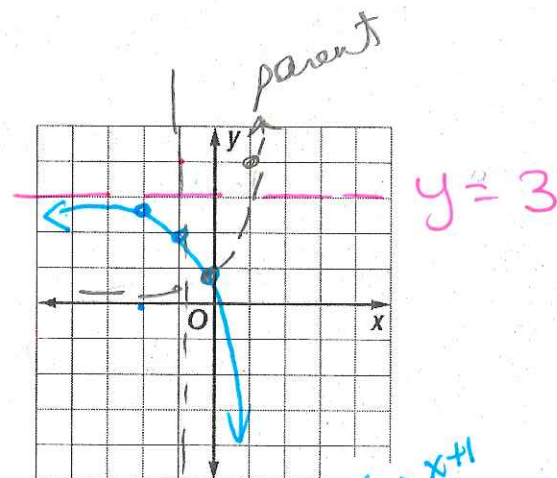
-1 left

6. $y = -(4)^{x+1} + 3$

parent $y = 4^x$

x	y
-1	1/4
0	1
1	4

x-1	-y+3
-2	2 3/4
-1	2
0	-1



Domain: \mathbb{R}

Range: $(-\infty, 3)$

Asymptote: $y = 3$

\mathbb{R}

$(-\infty, 3)$

$y = 3$

$y = -(4)^{x+1} + 3$